

BOLLETTINO

DEI

Musei di Zoologia ed Anatomia comparata

della R. Università di Torino

 N. 509 pubblicato il 2 Settembre 1905

VOL. XX

Remarks on the *Gagrellinae* Thor.

a Group of Opiliones, with Descriptions of some new species from Borneo.

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Dr. H. J. Hansen received the *Gagrellinae* herein described, which were all collected in Sarawak (North-West Borneo) by Mr. R. Shelford from Dr. G. Nobili of the Natural History Museum of Torino, to which institution they will ultimately be returned. This small collection I worked out on application of Dr. H. J. Hansen, and I have added a few observations and remarks on questions, which were already touched on in my paper « New and old Phalangiidae from the Indian Region » (Journ. Linn. Soc. London, Vol. XXVIII. 1903. pp. 466-509).

A. On the Systematic and Sexual Characters, found in the Tarsi of the Palps.

In a great many species of the *Gagrellinae* we find a pronounced sexual difference in the armature on the tarsi of the palps in the males. Thorell has noticed this character not only in *Ceratobunus annulatus* Thor. (1889. 1, p. 618), as set forth in my paper (1903. 6, p. 473), but also in *Marthana columnaris* Thor. (1891. 2, p. 723); Simon has later on (1901. 5, p. 81) used the same structure in the definition of his *Gagrella illusa* Sim. from Malakka; but neither of these two authors realised, that the dentition of the tarsus of the palp provides a sexual character of a more general value. In my above quoted paper I showed that a sexual, and to a certain degree also a systematic, character is found in the presence and the arrangement of these tarsal teeth on the palps of the males. In the following I will mention some modifications, partly accompanied by figures. In the majority of

species a single row of pointed teeth is found along the inner lower edge, which begins near the base and extends over the distal two thirds, f. inst. in *G. atrata* Stol. (6, p. 495); the row is rather short in the male of *G. fragilis* With as seen in fig. 1 (p. 12). In the one specimen of *Marthana vestita* n. sp., the tarsus was provided with a row of about 30 teeth, while in the other specimen the row contains about 15 teeth, as seen in fig. 2 (p. 12). With regard to the structure in *G. aenescens* Thor. and *G. splendens* With I refer to (6, p. 473). In a few species we find an inner, more proximal row of several teeth, and an outer, more distal row with a few teeth, f. inst. in *G. flavimaculata* With (p. 499), *G. triangularis* With (p. 500) and *G. imperator*, var. *dentata* With (p. 502). *G. triangularis* With (fig. 3, p. 12) has an inner row, the basal portion of which contains several teeth, densely placed, while the distal portion has only a few teeth, rather remote from each other, as well as an outer, more distal, consisting of about ten teeth, well separated from each other. The tarsi of the male of *G. imperator*, var. *dentata* With (6, p. 502) bear not only « an inner row of about 20 teeth », but also more distally and exteriorly about five teeth, far apart from each other. In *G. sarawakensis* n. sp. we find an other arrangement (fig. 4); there is an inner row of about 15 teeth, which begins near the base and extends to the middle, as well as an outer one, the four teeth of which are placed rather apart on the basal third of the tarsus.

B. On the Genera of the *Gagrellinae* Thor.

The discussion of this theme in my above-quoted paper (p. 474) is rather too short and not quite easy to follow; I am, moreover, inclined to think, that a new treatment of this topic may be useful, because I in that paper had no opportunity of discussing the position of *Verpulus* Sim., and had then not yet examined any specimen of *Marthana* Thor.

The genus *Verpulus* Sim. is, according to Simon, (5, p. 84) nearly related to *Hypsibunus* Thor., but « differt tubere oculorum reclinato, angusto, sed apice leviter ampliato omnino mutico et laeve, et pedibus-maxillaribus simplicibus, patella convexa intus haud producta ramulo carente et tibia patella haud longiore ». The first characters, taken from the sloping and shape of the tubercle, have probably only specific, but scarcely any generic value whatever. The character, which the dentition of the tubercle provides, can scarcely be claimed to be of great importance in the definition of a genus, when we take into consideration, that the armature of this organ is variable in a considerable degree even within the same species; f. inst. in *Hypsibunus*

vigilans With (6, p. 475), in which the tubercle in the one specimen of two was provided with a stout spine in addition to a few granules, while the tubercle of the other specimen had no such spine. The last character, taken from the structure of the palps, can not be regarded as a natural one in the definition of this genus, when we remember, that the patella of the palps is almost simple in *Hypsibunus vigilans* With. It seems thus evident that the genus *Verpulus* Sim. must disappear and be considered as a synonym to *Hypsibunus* Thor. The latter genus is according to Thorell (2, p. 679) different from *Zaleptus* Thor. by « tuberculo oculorum altissimo, etiam e fronte viso aliore quam latiore ». But we can scarcely regard this characteristic as quite sufficient, when it is taken into consideration, that the tubercle of *Zaleptus hirsutus* With is almost as high as broad, seen from the front, and that we find a similar high tubercle in some species of *Gagrella*, f. inst. *G. nobilis* With (6, p. 489) and *G. pauper* n. sp. (p. 7). The genus *Ceratobunus* Thor. differs according to Thorell (1889, 1, p. 616) « a *Zalepto* tuberculo oculorum bi-vel quadri-corni »; but the facts, that *Ceratobunus brevipes* With (6, p. 478) has four or six (five) thorns, and that *Hypsibunus vigilans* With (6, p. 475) has two thorns or none, show that this characteristic fails. It seems evident to me, that the three genera *Verpulus* Sim., *Hypsibunus* Thor. and *Ceratobunus* Thor. can not be regarded as natural, and ought consequently to be regarded as synonyms to *Zaleptus* Thor. When I in the following use the term *Zaleptus* Thor., it is in this wider sense. This genus is according to Thorell (1889, 1, p. 609, and 1891, 2, p. 678) characterized by its unarmed scutum and rather long legs; but the latter character must disappear, when we take into consideration, that the legs of *Zaleptus minutus* With (p. 481) and *Ceratobunus brevipes* With (p. 478) have exceedingly short legs. Thorell's genus *Melanopa* Thor. can not, as already shown (6, p. 483), be maintained and must be regarded as a synonym to *Gagrella* Stol.; the characteristic of the latter genus is thus found in the armature of the scutum with a single or with two spines, for the length of the legs, which are long or rather short, has scarcely any systematic value. The single character, in which the two genera *Gagrella* Stol. and *Zaleptus* Thor. differ from each other, namely that found in the armature of the scutum, is according to my opinion not quite sufficient for the definition of two genera, because the number of the spines is not quite constant within the same species of *Gagrella* Stol. e. g. *G. imperator* With (6, p. 501) and *G. sepia* Loman (6, p. 505), and the scutum is in *Zal. minutus* With sometimes provided with a low tubercle. The genus *Scotomenia* Thor. is according to Thorell (1, p. 661) related to *Melanopa* Thor. and only different « alia forma tu-

bereuli oculorum, pedibus etiam brevioribus, et scuto dorsali not spina vel spinis duabus, sed ut plurimum tuberculo armato ». But taking into consideration that the scutum of *Zaleptus minutus* With sometimes bears a tubercle, and that the legs of this species as well as of *Ceratobunus brevipes* With are almost as short as those in *Scotomenia cetrata* Thor., it seems to be evident, that the similarity between *Scotomenia* Thor. and *Zaleptus* Thor. is more pronounced than that which the former genus bears to *Gagrella* Stol. If the genus *Scotomenia* is to be maintained, it will be on account of its remarkable ocular tubercle. If we in the future wish to get a natural classification of the species belonging to the above-mentioned genera, we will probably be compelled to find an other base for our system than that used by Thorell.

Some of the other genera established by Thorell seem to be fairly well founded, f. inst. *Marthana* Thor. (2, p. 719) an account of its remarkable column; nevertheless the spine of *G. semigranosa* Sim. (5, p. 83) seems to bear some similarity to the column of *Marthana* Thor., as far as can be seen from the description. As I have set forth (6, p. 505) the genera *Syleus* Thor., *Systenocentrus* Sim. and *Oncobunus* Thor. ought to be referred to the same genus. The foundation of Thorell's genus *Artrocentrus* (1, p. 623) namely the spine, with which the second joint of the antenna is provided, seems to be rather too insufficient.

C. List of Species from Borneo.

Comparatively few species of this group, only eight, including the three, described here have been mentioned from Borneo, but several times this number without doubt occur; none of them have been mentioned from other parts of the Indian Region.

Gagrella insculpta Poc., *G. longipalpis* Thor., *G. paupera* n. sp., *G. sarawakensis* n. sp., *G. scrobiculata* Thor., *Marthana columnaris* Thor., *M. vestita* n. sp., *Zaleptus trichopus* Thor.

D. Description of new Species.

Gagrella Stol.

I hope that it will be fairly easy to identify the five species of *Gagrella* by the help of the following synopsis.

- a. Tibia of the palps about 10 times longer than broad **longipalpis**
Thor. (2, p. 693).
- b. Tibia of the palps not more than 2-4 times longer than broad.
- a¹. Scutum not foveolate, but granular; yellowish brown and provided
with two spines **paupera** n. sp. (p. 7).

- b*¹. Scutum foveolate; black with a single spine.
*a*². Trunk black without any yellow spot on cephalothorax or scutum
scrobiculata Thor. (p. 717).
*b*². Trunk black with yellow spots on cephalothorax.
*a*³. Scutum with a yellow spot on each side **insculpta** Poc. (4, p. 283).
*b*³. Scutum without yellow spots. Tips of the tibiae of the fourth pair
of legs bright yellow **sarawakensis** n. sp. (p. 5).

Gagrella sarawakensis, n. sp.

♂ *Ocular tubercle smooth; broader than high seen from in front. Scutum foveolate with a single spine. Tibia of the palps three times longer than broad. Femur I 8 times longer than second joint of the antennae. Trunk blackish with metallic shade above. Cephalothorax on each side of the ocular tubercle with a yellow spot, covered with a white waxy stuff. Tip of tibia IV yellow.*

Cephalothorax. — Cephalothorax almost triangular. The first transverse ridge just behind the ocular tubercle rather low; the second, which forms the hinder margin of the cephalothorax, is better marked; the area between these two tergites is in the middle rather short, but widened out laterally. Frontal processes rather stout and diverging, each terminating in a few short branches. Frontal eminence slightly marked and smooth. The depressed median triangle is not visible. The surface is between the spots towards the base of the ocular tubercle provided with rather indistinct impressions; the surface of the spots themselves is almost smooth or with very low depressions, but with a depressed darker cross in the middle. The head is foveolate along the anterior ridge; and so is the area between the two ridges in the middle, but laterally it is granular.

Tubercle. — The summit of the ocular tubercle is longitudinally grooved and has a few hairs, but no teeth or granules. Seen from the front it is much broader than high, rather suddenly narrowed just beneath the eyes and slightly foveolate at the base. The tubercle is seen from the side observed to be directed backwards, the anterior side being the longer and sloping, the posterior being distinctly rounded; it is as long as high anteriorly. The diameter of the eyes is equal to about two thirds of the distance between the eyes, and much shorter than the distance from their lower margin to the base of the tubercle. Eye placed nearer to the front than to the posterior margin.

Abdomen. — The *scutum* is raised towards the single almost smooth spine, more steeply from the sides towards the middle than from before backwards; the anterior and posterior slope is almost equally steep. No traces of the segmentation are visible. The whole

scutum is distinctly foveolate; it is provided with deep, more or less circular, pits, separated by ridges. The two first free tergites behind the scutum are embedded in a wide area of white soft skin; they are smooth, or almost so, the lateral extremities of the former, which are finely granular, excepted; the eighth tergite as well as the anal operculum seem to be finely punctulate. The sternites, as well as the genital operculum, seem to be completely smooth; the coxae are provided with a number of big, low granules, placed rather apart.

Appendages. — Basal joint of the *antennae* bear no granules above. — The *femur* of the *palps* is slightly longer than the patella plus tibia, but a little shorter than the tarsus. The femur bears below a longitudinal row of teeth near to the outer margin; interiorly it has few, placed more proximally. The patellae and tibiae are almost smooth; the tibia is one and a half time as long as patella and, seen from above, three times longer than broad. The *tarsus* (fig. 4, p. 12) is provided with a row of about four teeth, placed exteriorly in the basal third portion, as well as with an interior row of about 15 teeth, which begins near the base and extends to the middle; there are minor differences in the arrangement of the teeth of the right and left tarsus. — The *legs* are very long and slender; their femurs are provided with the usual longitudinal rows of small spines or teeth.

Colour. — The cephalothorax is blackish or blackish brown with a big yellow spot at each side of the tubercle; this spot has in the middle a black-cross-shaped impression and is completely covered with a white waxy stuff. The scutum is blackish with trace of metallic gloss. The free tergites are brownish and the articulate membranes yellow. Underside yellowish and partly covered with the same white waxy stuff as the spots of the cephalothorax; each sternite with a transverse darker band. The coxae are black and partly covered with the white waxy stuff; the third coxa with an indistinct yellow median spot, and the fourth with the anterior distal portion almost white. The antennae are very light yellowish, the palps are brown or yellowish brown, the distal half of the femur and the two following joints being the darkest. The legs are brown with more yellowish tarsi, the tibiae of the fourth pair are distally yellow.

Measurements. — Femur I = 11.5, fem. II = 20, fem. III = 10, fem. IV = 14 mm.; leg. I = 54, leg. II = 90, leg. III = 51, leg. IV = 70 mm. The second joint of the antennae 1.25 mm. The body 5 mm. long, 3 mm. broad and 3 mm. high.

Material. — I have examined a single male from Mt. Matang (Sarawak).

Remarks. — This species seems to be very nearly related to *G. scrobiculata* Thor, (2, p. 717) as well as to *G. insculpta* Poc. (4, p. 283):

they are all characterized by the foveolate sculpturing of the scutum. It differs from both by its smooth tubercle. An other character is found in the colour; for it is similar to *G. insculpta* Poc. by the yellow spot of the carapace but differs from it by the uniform colour of the scutum; in the latter character there is a similarity to *G. scrobiculata* Thor., but in the former a difference.

Gagrella paupera, n. sp.

Ocular tubercle almost smooth; almost as broad as high seen from in front. Scutum granular and provided with two spines. Tibia of the palps scarcely twice longer than broad. Femur I about 8 times longer than the second joint of the antennae. Trunk brownish, scutum with indistinct lighter spots.

Cephalothorax. — Cephalothorax almost triangular. The two transverse ridges behind the ocular tubercle are well marked, the hinder being much the longer. Frontal processes are parallel, slender, pointed and exteriorly dentate. The depressed median triangle, in the middle of which the ocular tubercle is situated, is rather well developed. The cephalothorax is rather densely granular with small granules; this granulation is less marked in the middle and almost wanting anteriorly just behind the frontal processes.

Tubercle. — The crest of the tubercle is deeply grooved and almost smooth; only in front provided with a few minute teeth. The anterior and in a lesser degree the posterior surfaces are beset with bigger or smaller teeth. The tubercle is seen from the front as high as it is broad above, and much narrower at the base. Seen from the side it is almost perpendicular, and much higher in front than behind; anteriorly it is almost straight, posteriorly moderately rounded and here as high as the tubercle is long. The diameter of the eyes is distinctly shorter than the distance between the eyes, but almost equal to the distance from their lower margin to the base of the tubercle. The eye is placed nearer to the front than to the posterior margin.

Abdomen. — The *scutum* is provided with two spines; the anterior, which is placed far behind the front margin, is the shorter and directed upwards and very slightly forwards; the posterior spine, which is as far distant from the anterior, as this from the front margin, is the longer and directed backwards and upwards. The slope of the scutum from the front towards the second spine is scarcely marked, but the declivity behind is very steep; the outline of the body from the spine to the anal operculum is almost circular. The scutum is only slightly raised from the sides towards the middle. The tergites are marked by more or less distinct transverse grooves. The scutum,

as well as the free tergites behind, are rather densely granular all over with moderately big granules. The sternites are almost smooth; the genital operculum and the coxae, especially the former, with a number of rather big granules.

Appendages. — Basal joints of the *antennae* bear above a few black granules. — The *femur* of the *palps* is equal in length to the two following joints, but much shorter than the tarsus. The femur bears a ventral row of large, pointed teeth from base to tip; the outer side bears below an imperfect row of small teeth, and above a basal as well as a distal area of black spines; the inner side is near the lower margin provided with a distal row of small teeth and more dorsally with one, consisting of about eight stout, rather big teeth, which begins near the base and extends to the middle; the latter row is moderately curved upwards in the middle. The patella as well as the tibia, especially the former, are beset with spines, chiefly inwards. The patella is much shorter than the tibia; this feature is only distinct, when seen from the side; seen from above they seem to be of equal length. The tibiae are scarcely twice longer than broad. The *tarsus* is almost as long as the femur plus the patella. The *procursus maxillaris internus* is bifurcate; the upper branch is pointed, curved and much the longer. — The *legs* are long and slender with the usual row of small teeth or spines.

Colour. — The colour of the trunk is pale brown; the scutum has indistinct yellow spots. The legs are brown; the antennae and palps are yellowish brown.

Measurements. — Femur I = 13, fem. II = 22, fem. III 12, fem. IV 16 mm. The second joint of the antennae 1.5 mm. Body 5 mm, long and 3 mm. broad.

Material. — I have examined a single mutilated specimen from Mt. Matang (Sarawak).

Marthana Thor.

Of this genus which is characterized by its remarkable column, only three species have been described, namely *M. turrita* Thor.; the locality of which is unknown, *M. columnaris* Thor. from Borneo and *M. cuspidata* Lom. from Java; a fourth species, *M. vestita* n. sp., from Sarawak will be described here. I hope that the following synopsis of these species will be of some value.

- a. Column gradually narrower toward the extremity, directed slightly forwards and provided with a terminal, slender, process directed backwards.

cuspidata Lom. (3 p. 12).

- b.* Column not narrower towards the extremity, almost perpendicular and without any terminal process.
- a*¹. Column with two diverging spines, an anterior and a posterior. Cephalothorax partly covered with a waxy stuff.
- a*². Cephalothorax reddish brown, almost completely covered with waxy stuff. **vestita** n. sp. (p.).
- b*². Cephalothorax with lighter bands and only partly covered with waxy stuff. **columnaris** Thor. (2 p. 722).
- b*¹. Column without diverging spines. Cephalothorax without waxy stuff. **turrata** Thor. (2 p. 720).

Marthana vestita, n. sp.

♂ *Ocular Tubercle* smooth above, below anteriorly with a single tooth; almost twice broader than high, seen from the front. Scutum granular in front. Column very high, almost perpendicular and granular with big granules; summit with two diverging spines, an anterior and a posterior. Tibia of the palps three times longer than broad. Femur I about 8 times longer than the second joint of the antennae. Cephalothorax reddish brown with black tubercle and covered with a white waxy stuff. Scutum black.

Cephalothorax. — Cephalothorax almost square. The first transverse ridge rather short and well marked; the second thoracic tergite is rather long and separated from the first by a deep transverse groove; the anterior portion slopes gradually into the posterior, which has a well raised hinder margin. Frontal processes are not very pronounced, broad undivided, but with a few indistinct marginal teeth, depressed median triangle laterally limited by some longitudinal impressions; similar, less marked ones, are found near the lateral margin of the head. The head is completely smooth; the first thoracic tergite has a few granules in the middle and so has the second; but the latter is besides rather densely granular near the lateral margin.

Tubercle. — The ocular tubercle is longitudinally grooved and almost completely smooth, only a single, rather stout tooth is found at the base near the front margin. The tubercle is very low and seen from the front almost twice broader than high; it is a little narrower at the base than at the top. Seen from the side it is a little longer than high and has the hinder side steeper than the front. The diameter of the eyes is almost equal to the distance between them, and much longer than the distance from their lower margin to the base of the tubercle. Eyes placed distinctly nearer to the hindmost than to the front margin (fig. 5 p. 12).

Abdomen. — The anterior portion of the scutum, viz. the first and

second segment, is prolonged into a long and thick *column*, which consequently is placed just behind the posterior margin of the cephalothorax; its length is greater than that of the scutum, and equal to one third of its breadth at the base. It is almost cylindrical, moderately thinner towards the middle, (a feature most marked, when seen from behind) and distinctly enlarged terminally, where it is compressed. The top is provided with two spines, both situated in the longitudinal section of the body; the one, the anterior, is directed forwards and upwards, the other, the posterior, backwards and upwards (fig. 5). Each spine is almost equal to half the length of the top of the column; the distance between the bases of the spines equal to the length of the tibial part in lateral view, distance between tips of spines equal to the length of the tarsus of the palps. The outline of the body between the ocular tubercle and the column is scarcely slanting, but the slope of the scutum behind the column is well marked, but rather smooth. The scutum consists of seven segments, not of five as generally in the *Gagrellinae*; the five first are marked by indistinct transverse grooves; the sixth and seventh have no movement of their own in this species, as their articulating membranes are quite stiff and immovable. The eighth tergite is completely free. The anterior portion of the scutum, as well as its descending lateral portion, are beset with flat granules, standing rather apart especially towards the middle; the base of the column is provided with similar but bigger granules, gradually merging into the rather big tubercles of different size and structure, with which the median portion is armed; the tubercles of the top are scarcely as big as those of the middle. The tubercles of the column seem to be placed without proper order, sometimes densely crowded sometimes far apart. The sixth and the seventh tergites are almost smooth, the articulating membranes completely so. The eighth tergite is provided with bigger granules, especially posteriorly. The sternites are provided with a single transverse row of granules. The genital operculum, as well as the coxae, bear similar but bigger granules, placed rather apart.

Appendages. — The basal joint of the *antennae* has in the middle above, where the joint is raised, a number of black granules. — The *palps* are simple. Their *femur* is equal in length to the two following joints, but distinctly shorter than the tarsus; the lower side is provided with a number of bigger and smaller teeth. The patella is enlarged distally; its inner surface is beset with small granules, while the outer and upper sides are smooth, but for a transverse row of teeth along the front margin. The tibia is almost one and a half longer than the patella and about three times longer than broad. The *tarsus* has a longitudinal row of 34 teeth with black tips, which begins near

the base and extends beyond the middle. — The *legs* are long, but rather thick; only the femora of the two last pairs provided with longitudinal rows of minute spine or teeth; the femora of the two first pairs are provided with a row of hairs.

Colour. — The cephalothorax is reddish brown with some of the depressed grooves, as well as the hindmost margins of the two thoracic tergites darker; the ocular tubercle is black; almost the whole cephalothorax with the exception of the ocular tubercle is covered with a jellowish waxy struff. The scutum is blackish brown; the column is chocolate; but the two colours blend into each other. Sides of the scutum partly covered with the same waxy stuff as the cephalothorax. The ventral surface seems to be blackish; but this colour is not visible, as a thin layer of a white stuff is found everywhere. The antennae and palps are dark brown; the former appear more polished. The legs are lighter brown.

Measurement. — Femur I = 11,5, femur II = 23, fem. III = 10,5, fem. IV = 15 mm.; leg. I > 47, leg. II = 80, leg. III = 45, leg. IV > 50 mm. The second joint of the antennae 1,5 mm. The body 7 mm. long, 4,5 mm. broad and 7 mm. high, measured from top of the column.

Variation. — The other specimen, examined, differs in some respects. The column is comparatively shorter and thicker, though in a very slight degree; it is less widened out towards the top and its tubercles are smaller. The granulation of the scutum is better marked. The colour of the body is somewhat darker. The number of the teeth, which are placed along inner margin of the tarsus of the palp fewer, namely only 15 (fig. 2. p. 12).

Material. — I have examined two males from Mt. Penrissen (Sarawak).

Remarks. — This species seems to be very nearly related to *M. columnaris* Thor. (2. p. 722); the main differences are found in the granulation, colouring and covering of the cephalothorax.

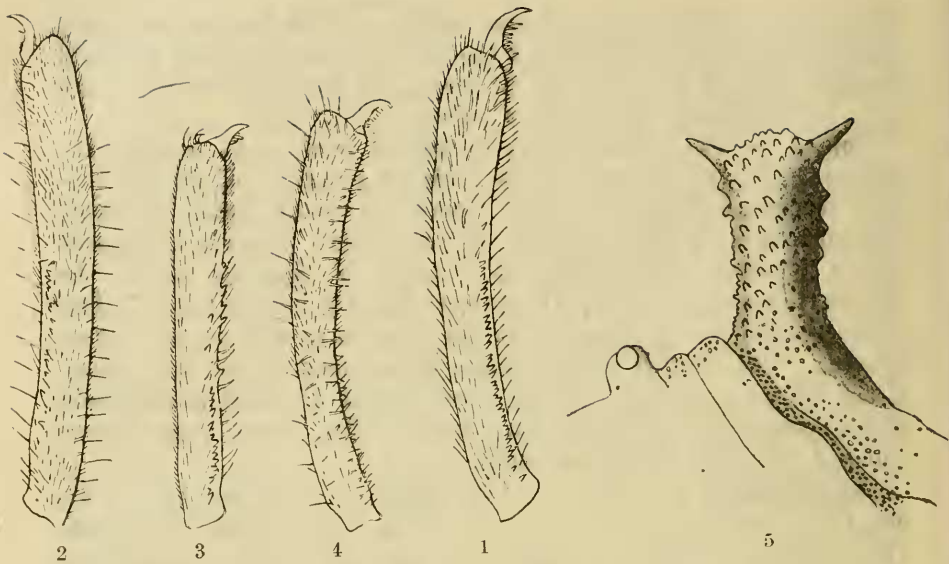


Fig. 1. — *Gagrella fragilis* With ♂ Tarsus of left palp × 41.
Fig. 2. — *Marthana vestita* n. sp. ♂ Tarsus of right palp × 32.
Fig. 3. — *Gag. triangularis* With ♂ Tarsus of left palp × 41.
Fig. 4. — *Gag. sarawakensis* n. sp. ♂ Tarsus of right palp × 31.
Fig. 5. — *Marthana vestita* n. sp. ♂ The Column in lateral view × 10.

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